

## **THE CYBER AGE POLYMER BANKNOTES**

**Introduction:** Polymer banknotes are banknotes made from a polymer such as biaxially oriented polypropylene (BOPP). Such notes incorporate many security features not available to paper banknotes, including the use of metameric inks; they also last significantly longer than paper notes, resulting in a decrease in environmental impact and a

reduction of production and replacement costs. Modern polymer banknotes were first developed by the Reserve Bank of Australia (RBA), CSIRO and The University of Melbourne. They were first issued as currency in Australia in 1988. In 1996 Australia switched completely to polymer banknotes. Countries that have since switched completely to polymer banknotes include Brunei, New Zealand, Papua New Guinea, Romania, Vietnam, Fiji, Mauritius, Canada, Malaysia and Israel.

**History:** In 1967 forgeries of the Australian \$10 note were found in circulation and the Reserve Bank of Australia was concerned about an increase in counterfeiting with the release of colour photocopiers that year. In 1968 the RBA started collaborations with CSIRO and funds were made available in 1969 for the experimental production of distinctive papers. The insertion of an optically variable device (OVD) created from

diffraction gratings in plastic as a security device inserted in banknotes was proposed in 1972. The first patent arising from the development of polymer banknotes was filed in 1973. In 1974 the technique of lamination was used to combine materials; the all-plastic laminate eventually chosen was a clear, BOPP laminate, in which OVDs could be inserted without needing to punch holes. An alternative polymer of polyethylene fibers marketed as Tyvek by DuPont was developed for use as currency by the American Bank Note Company in the early 1980s. Tyvek did not perform well in trials; smudging of ink and fragility were reported as problems. Only Costa Rica and Haiti issued Tyvek banknotes; test notes were produced for Ecor, El Salvador, Honduras and Venezuela but never placed in circulation. Additionally, English printers Bradbury Wilkinson produced a version on Tyvek but marketed as Bradvek for the Isle of Man in 1983; however, they are no longer produced.

**Development:** Polymer banknotes were developed in Australia to replace paper banknotes with a more secure and more durable alternative. The BOPP substrate is processed through the following steps:

- **Opacifying** – two layers of ink (usually white) are applied to each side of the note, except for an area(s) deliberately left clear;

- **Sheeting** – the substrate is cut into sheets suitable for the printing press;
- **Printing** – traditional offset, intaglio and letterpress printing processes are used;
- **Overcoating** – notes are coated with a protective varnish.

**BOPP:** BOPP is a non-fibrous and non-porous polymer. Compared to paper banknotes, banknotes made using BOPP are harder to tear, more resistant to folding, more resistant to soil, waterproof, easier to machine process, and are shreddable and recyclable at the end of their lives.

**Security features:** Traditional printed security features applied on paper can also be applied on polymer. These features include intaglio, offset and letterpress printing, latent images, micro-printing, and intricate background patterns. Polymer notes can be different colours on the obverse and reverse sides. Like paper currency, polymer banknotes can incorporate a watermark in the polymer substrate. Shadow images can be created by the application of optically variable ink, enhancing its fidelity and colour shift characteristics. Security threads can also be embedded in the polymer note; they may be magnetic, fluorescent, phosphorescent, micro-printed, clear text, as well as windowed. Like paper, the polymer can also be embossed.

Polymer notes also enabled new security features unavailable at the time on paper, such as

transparent windows, and diffraction grating. Since 2006 however the development of the paper transparent window technologies by De La Rue (Optiks) and G&D (varifeye) have reduced that advantage. The transparent window where the OVD is located is a key security feature of the polymer banknote. It is easily identifiable, allowing anyone to be able to authenticate a banknote. Because the polymer bank note contains many security features that cannot be successfully reproduced by photocopying or scanning, it is very difficult to counterfeit. The complexities of counterfeiting polymer banknotes are proposed to act as a deterrent to counterfeiters. The substrate BOPP film, metalized or otherwise is widely available from European and Chinese suppliers, as is the metamerics inks used.

**Adoption of Polymer Banknotes:** Trading as Innovia Security, Innovia Films markets BOPP as 'Guardian' for countries with their own banknote printing facilities. Note Printing Australia (a subsidiary of the RBA) prints commemorative banknotes and banknotes for circulation and has done so for 20 countries. As of 2011, at least seven countries have converted fully to polymer banknotes: Australia, Bermuda, Brunei, New Zealand, Papua New Guinea, Romania and Vietnam. Other countries and regions with notes printed on Guardian polymer in circulation include: Bangladesh, Brazil, Canada, Chile, Dominican Republic, Hong Kong (for a 2- year

*trial), Indonesia, Israel, Malaysia, Mexico, Nepal, Solomon Islands (no longer issued), Sri Lanka, Thailand, Samoa, Singapore and Zambia. Canada released its first polymer banknote (\$100) on 14 November 2011, followed by the \$50 banknote on 26 March 2012 and the \$20 banknote on 7 November 2012 and finally, the \$10 and \$5 banknotes on 7 November 2013.*

## THREE DAYS TO SEE

**About the Author:** Helen Keller was born in Alabama (USA) in 1880. She was deaf and blind. Anne Sullivan, a graduate from Perkins Institute for the Deaf, became her teacher and governess and remained her companion for many years. Helen Keller was an exceptionally talented author, political activist, and an inspirational lecturer. Many of her works express the simple fragments of life which, together, fabricate the essence of living. As demonstrated in her essay “Three Days to See”. Helen brings forward her imagination and desire to further understand the world in a depiction of what she would do should she be given the use of her sight for just 3 days.

**Introduction:** “Three Days to See” by Helen Keller, is a fascinating account of what we can really see, perceive and assimilate from the wonderful world around us. Her life should be an example for the humans. It is an excellent rule to live each day as if we should die tomorrow. It would teach us values of life. The writer, while making a systematic plan of all the things she would like to see if she were gifted eye-sight for just three days and nights, makes one realize how insensitive human beings are to their senses.

**Day One:** She would see all the people who made her life worth living, particularly Mrs. Anne Sullivan Macy. Macy opened the outer world to her

as a child. She wants to study her teacher’s face who is the evidence of sympathetic tenderness and patience. She likes to see in her teacher’s eyes which give strength of character which has enabled her to stand firm in the face of difficulties, and that compassion for all humanity which she has revealed to me so often. She wants see all her dear friends and look long into their faces, imprinting upon her mind the outward evidences of the beauty. And busy with viewing small simple things of her home. She wants to see the warm colours in the rugs under her feet, the pictures on the walls, the intimate trifles that transform a house into home. She is going to read some printed colourful books which are helping her to understand the human life and human spirit. First day afternoon she wants to take long walk in the woods and intoxicate her eyes on the beauties of the world of nature, trying desperately to absorb the beauty of the nature permanently in her mind. At night she is going to get interesting experience by seeing artificial light, which the genius of man has created to extend the power of his sight when Nature decrees darkness. She is not going to sleep because her mind is full of memories of the day and waiting for the second day experience.

**Day Two:** On second day, she would wake up seeing the magnificent panorama of light at Sunrise. She wants to see a pageant of man’s progress through the ages. With the help of great

*New York Museum, the Metropolitan Museum of Art and the Museum of Natural*

*History, in the second day she needs to know the past and present history and the great progress of human kind, how the man achieved the control on the world with his tiny stature and powerful brain. She wants to see the huge carcasses of dinosaurs and mastodons that roamed the earth before. She tries to know how the man created his secure home on this planet and a thousand and one other aspects of natural history. In the Metropolitan museum of Art, she wants to see the statues of Apollo, Venus, the Island of Samothrace, Homer, Moses and Rodin. And different art styles Roman sculpture, Gothic wood carving and the simple line of a Greek vase etc. She needs to look the magnificent world of paintings like Raphael, Leonardo da Vinci, Titian El Greco, Veronese and Rembrandt. In the second day evening she is going to spend the time at a theater or at the movies there she need to observe and watch the different characters like Hamlet, Falstaff and Joseph Jefferson, Rip Van Winkle etc. All together the second day is an imaginary day of sight, the great figures of dramatic literature would crown sleep from her eyes.*

**Day Three:** *On the third and last day of sight, Helen would drive from her home town surrounded by lawns, trees and flowers. It is a haven of peaceful rest for men who toil in the city. She would drive on the bridge, the lacy steel structure*

*built across the East River. The structure is a symbol of the power and skill of the mind of man. She would watch the delightful activities and busy boats upon the river. She would look at the fantastic towers and steel structure of New York which only gods built for themselves. She feels happy when people smile at her and feels proud when she finds serious determinations on their faces. She becomes compassionate when she sees suffering people. Then she goes to the fifth avenue and is impressed by the colour of women dresses. She wants to become a window-shopper. From there, she goes to Park Avenue, slums, factories and parks and also visits foreign quarters. She wants to know how people work and live. Some sights would be pleasant, but some pathetic. Before the third day of sight comes to an end, she wants to see a funny play in a theatre. She wants grasp the sense of comedy in the human spirit. By the close of three days, her mind would be crowded with glorious memories. So there would be no regrets for the loss of sight once. She would advise us to make the most every sense to enjoy all the facets of pleasure and beauty which nature provides.*

**Conclusion:** *The God gave very precious and powerful gifts to us but we are not using them properly if we use these valuable gifts we can make wonders in the world. Helen Keller had physical challenges but she took her life as a challenge and she achieved and created history. Through this lesson we can learn how to lead our life in positive prospect and how to use our natural powerful gifts to make our lives for good cause.*